much higher relative to that of the chloride ion, decomplexation in phase 2 (strip phase) can occur when a very high chloride ion concentration has been established. The equilibrium reaction for this process is

$$RCl + NO_3^- \Leftrightarrow RNO_3 + Cl^-$$

Very high concentration factors can be obtained with coupled facilitated transport processes of this kind.

VI.4.4.2 *Aspects of separation [65]*

As has been shown in figure VI - 36, the transport of oxygen through water can be enhanced by the addition of a specific carrier. Two mechanisms contribute to the total oxygen flux through the membrane, i.e. the oxygen molecules form a complex with the carrier and this carrier molecule diffuses through the membrane. The second part is the 'normal' Fickean diffusion of dissolved oxygen across the membrane.

Figure VI - 38 shows the concentration profiles when diffusion occurs via Fickean diffusion (molecular oxygen) and by diffusion of a carrier-oxygen complex (complexed oxygen). Both transport mechanisms occur simultaneously. Let us first consider the simple case, i.e. one-component transport. The permeant A can react with the carrier C to form a carrier-solute complex AC

$$A + C \Leftrightarrow AC$$

This complex can then be transported across the membrane either in the uncomplexed or complexed form. The total flux of component A will then be the sum of the two contributions, i.e.

$$J_A = \frac{D_A}{\ell} (c_{A,o} - c_{A,\ell}) + \frac{D_{AC}}{\ell} (c_{AC,o} - c_{AC,\ell}) \qquad \text{(VI - 85)}$$

The first term on the right-hand side of eq. VI - 85 represents permeant diffusion according to Fick's law, where D_A is the diffusion coefficient of (the uncomplexed) component inside the liquid film while $c_{A,o}$ is the concentration of component A just inside the liquid film. The second term represents carrier-mediated diffusion with the flux being proportional to the driving force, which in this case is the concentration difference of complex across the liquid film. D_{AC} is the diffusion coefficient of the complex and $c_{AC,o}$ is the concentration of the carrier-solute complex at the interface. The equilibrium constant of the complexation reaction is given by

$$K = \frac{c_{AC_o}}{c_{A_o}\, c_C} \qquad \text{(VI - 86)}$$